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Architectural Survey of a Water Tower in Youngstown Air Reserve Station

Chris J. Cochran and Adam Smith

November 2010



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Final Report

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Prepared for Youngstown Air Reserve Station
3976 King Graves Road
Vienna, OH 44473

Abstract: This document is an assessment of the base water tower at the Youngtown Air Reserve Station. Since its construction in 1952, the water tower has remained generally unchanged. The demolition and reconstruction of surrounding buildings makes Youngstown Air Reserve Station ineligible for the NRHP as a historic district.

This survey satisfies Section 110 of the National Historic Preservation Act of 1966 as amended, and was used to determine the eligibility of the water tower for inclusion on the NRHP.

It is the determination of this report that the water tower is not eligible to the National Register of Historic Places (NRHP) since it is not individually significant and is not part of a great historic district.

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Preface

This study was conducted for the Youngstown Air Reserve Station (ARS), under project No. 333529, “Youngstown ARS Survey.” Funding was provided by Military Interdepartmental Purchase Request (MIPR) F5Q3370173G001. The technical monitor for the was John Tarantine, Youngstown ARS.

The work was performed by the Land and Heritage Conservation Branch (CN-C) of the Installations Division (CN), Construction Engineering Research Laboratory (CERL). Adam Smith was the CERL Project Manager and lead architectural historian and Chris J. Cochran was the assistant architectural historian. Special acknowledgement is given to those who assisted with the formation of this report: John Tarantine and Max Shifflet, Youngstown ARS. Dr. Christopher White is Chief, CN-C, and Dr. John Bandy is Chief, CN. The Deputy Director of CERL is Dr. Kirankumar V. Topudurti. The Director of CERL is Dr. Ilker R. Adiguzel.

CERL is an element of the U.S. Army Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. The Commander and Executive Director of ERDC is COL Gary E. Johnston, and the Director of ERDC is Dr. Jeffery P. Holland.

Unit Conversion Factors

Multiply	By	To Obtain
acres	4,046.873	square meters
cubic feet	0.02831685	cubic meters
cubic inches	1.6387064 E-05	cubic meters
degrees Fahrenheit	$(F-32)/1.8$	degrees Celsius
feet	0.3048	meters
gallons (U.S. liquid)	3.785412 E-03	cubic meters
inches	0.0254	meters
miles (U.S. statute)	1,609.347	meters
pounds (mass)	0.45359237	kilograms
square feet	0.09290304	square meters
square miles	2.589998 E+06	square meters
tons (2,000 pounds, mass)	907.1847	kilograms
yards	0.9144	meters

1 Methodology

Background

Through the years, the U.S. Congress has enacted laws to preserve our national cultural heritage. The first major Federal preservation legislation was the Antiquities Act of 1906. This Act was instrumental in securing protection for archeological resources on Federal property. The benefits derived from this Act and subsequent legislation precipitated an expanded and broader need for the preservation of historic cultural resources. With this growing awareness, the Congress passed the National Historic Preservation Act of 1966 (NHPA), the most sweeping cultural resources legislation to date.

The Congress created the NHPA to provide guidelines and requirements aimed at preserving tangible elements of our past primarily through the creation of the National Register of Historic Places (NRHP). Contained within this piece of legislation (Sections 110 and 106) are requirements for Federal agencies to address their cultural resources, defined as any prehistoric or historic district, site, building, structure, or object. Section 110 requires Federal agencies to inventory and evaluate their cultural resources. Section 106 requires the determination of effect of Federal undertakings on properties deemed eligible or potentially eligible for the NRHP.

Youngstown Air Reserve Station (YARS) is located 9 miles north of Interstate 80 in Vienna, OH (Figure 1). Located in Trumbull County, YARS is approximately 17 miles north of Youngstown, OH, 60 miles northeast of Akron, OH, and 83 miles northwest of Pittsburgh, PA. YARS is part of the U.S. Air Force Reserve Command (AFRC).

In 2009, the report *Evaluation of Cold War Era and Potential National Register of Historic Places Eligible Properties: Youngstown Air Reserve Station* (Mitchell 2009.) identified the YARS water tower (the geographically located of which is shown in Figure 2) as potentially eligible for the National Register of Historic Places.



Figure 1. Location map of YARS (U.S. Census Bureau).

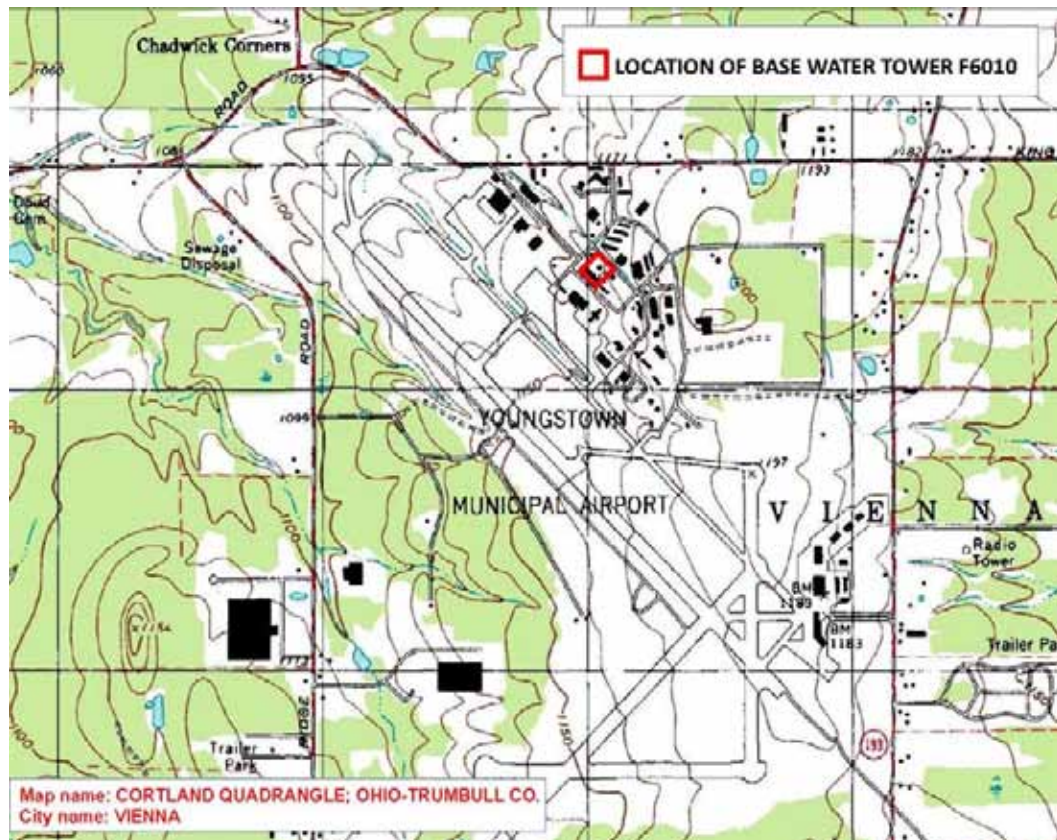


Figure 2. Map of YARS (AFRC GIS).

Per Section 110 of the NHPA, YARS must evaluate all of its buildings and structures 50 years of age and older. YARS has completed two architectural surveys for their Section 110 compliance: *Final Report for Historic Buildings Survey, YARS, Vienna, OH* (Resource Applications, Inc. 1996), and *Evaluation of Cold War Era and Potential National Register of Historic Places Eligible Properties: Youngstown Air Reserve Station* (Mitchell 2009). The Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC-CERL) was tasked to undertake the full assessment of the water tower located at YARS.

Objectives

The objective of this study was to determine the historical significance of the 1952 water tower at the YARS in Vienna, OH, specifically, (at the request of AFRC) to assess the water tower at YARS for eligibility to the NRHP. For a property to qualify for the NRHP, it must meet at least one of the National Register Criteria for Evaluation, must be significantly associated with an important historic context, and must retain sufficient integrity to convey its significance.

Approach

This work was accomplished in the following steps:

1. *Archival Research.* Archival research involves two primary tasks, the initial literature review, followed by the identification and location of primary research materials:
 - a. Literature review. The research team used the existing architectural survey for a general understanding of the history of YARS. Secondary literature determined the history of water tower construction and their significance in the history of the United States and of YARS. Sources included a variety of published and unpublished material, notably: the *Final Report for Historic Buildings Survey, Youngstown Air Reserve Station, Vienna, OH* (Resource Applications, Inc. 1996), *They Didn't Just Grow There—Building Water Towers in the Postwar Era* (Spreng 1992), and *Towers and Tanks for Water-Works* (Hazlehurst 1904).
 - b. Primary research materials. The research team located primary research materials and additional secondary sources to establish a strategy to best use these resources. Research material for the water tower was gathered during the site visit to YARS; including maps, information from the 910th Mission Support Group (MSG) Civil Engineering (CE); and items filed in the Environmental Engineering section.

2. *Site Visit.* In August 2010, members of the research team conducted one site visit to YARS to survey the water tower and conduct research. During this visit, researchers collected archival information, such as maps and historic photographs from Cultural Resources. Researchers conducted site reconnaissance on foot using photography, sketches, and note taking to assist in analyzing the YARS as a whole and to understand its individual features. After the site visit, the research team made preliminary determinations of historic significance.
3. *Analysis.* After completing the initial research, the team analyzed the gathered resources and information. Historic maps and photographs were examined and compared to current day conditions. Water tower history was researched and was synthesized with information taken from the National Register Database to catalog water tower design types. The team used those resources to determine the structure's integrity, and then, based on historic context and themes, determined its historic significance.
4. *Evaluation.* The evaluation of structures followed the guidelines in the National Register Bulletin #15, *How to Apply the National Register Criteria for Evaluation*, and National Register Bulletin #16, *How to Complete the National Register Registration Form*. In addition, the survey followed the Department of Defense guidance, *Guidelines for Identifying and Evaluating Historic Military Landscapes* (Loechl et al. 2009).

Mode of technology transfer

This report will be made accessible through the World Wide Web (WWW) at URL: <http://www.cecer.army.mil>

2 Historic Context

This chapter contributes to the evaluation of the significance of the water tower at YARS by situating it within the general historic context of water tower design and construction.

Early history of water towers

Water distribution has always been important in human civilization. Most notable are the precisely engineered Roman aqueducts that—to this day—transfer water over long distances. Aqueducts use gravity to convey water from higher to lower elevations and regional topography determined water system design and location. Often, these systems included networks of fountains and retention basins (Hazlehurst 1904, p 1). While water systems materials and designs have changed, the basic gravity-fed concept used by the Romans remains the same.

The oldest water system in the United States dates from 1754 when Hans Christopher Christiansen erected a 225,000-gal standpipe in Bethlehem, PA (Hazlehurst 1904, p 5). Standpipes are supported directly on the ground and the pressure needed for the water system determines the height of the structure (Figure 3). Most municipalities in the United States use gravity-fed water systems that use water tanks to provide adequate pressure for the system.

The primary purpose of water tanks today is to store water and pressurize water systems, although historically, tanks were used for other purposes. With the advent of railroads, water tanks were built near rail lines to replenish the water needed for steam locomotives. In urban areas, water tanks provide needed reservoirs for firefighting (Gray 1947, p 1).

In the United States, elevated water tank design adopted four basic types of construction. Effective water tanks require two structural elements. The first is the water reservoir and the second is a structure that elevates the reservoir to the required elevation to pressurize the system. Elevated water tanks can be constructed out of wood planks held in place with wrought-iron tie rods (Figure 4). Another type is the circular tank using steel plates welded together to cover the full depth of the tank (Figure 5). A third type

is the iron cylindrical tank with tension hoops. The fourth type is the circular reinforced concrete tank (Gray 1947, p 1).

Two water tower constructing companies predominated from 1946 through 1980. Together, the Chicago Bridge and Iron Company and the Pittsburgh-Des Moines Steel Company employed around 1000 workers and erected between 8,000 and 11,000 water towers between the Mississippi River and the Rocky Mountains (Spreng 1992, pp 130-141).

In the 1950s, water tank design evolved with improvements in design, materials, and construction techniques using double-ellipsoidal (Figure 6) and torospherical designs (Figure 7) (Spreng 1992, p 136). Later in the 1960s, the pedestal (Figure 8) and the hydropillar designs (Figure 9) became popular; these designs are still built.

Many water towers are also architectural expressions that do not resemble typical water tower design. Some military installations use stone water towers, e.g., the standalone tower at Madison Barracks, NY (Figure 10), and the tower at Fort Sheridan, IL, which also unites the main barracks district (Figure 11). Some unique water tower designs serve a secondary advertising purpose, e.g., the water tower at the G. S. Suppiger catsup bottling plant in Collinsville, IL (Figure 12). No matter what their design, water towers remain the primary means of collecting and distributing most municipal water supplies (Becher and Becher 1988, p 13).



Figure 3. Standpipe at Naval Support Facility Indian Head, MD on left and an elevated water tank on right at Fort Gordon, GA (CERL).



Figure 4. Wooden tank design in Beaumont, KS (J. Stephen Conn on Flickr.com).

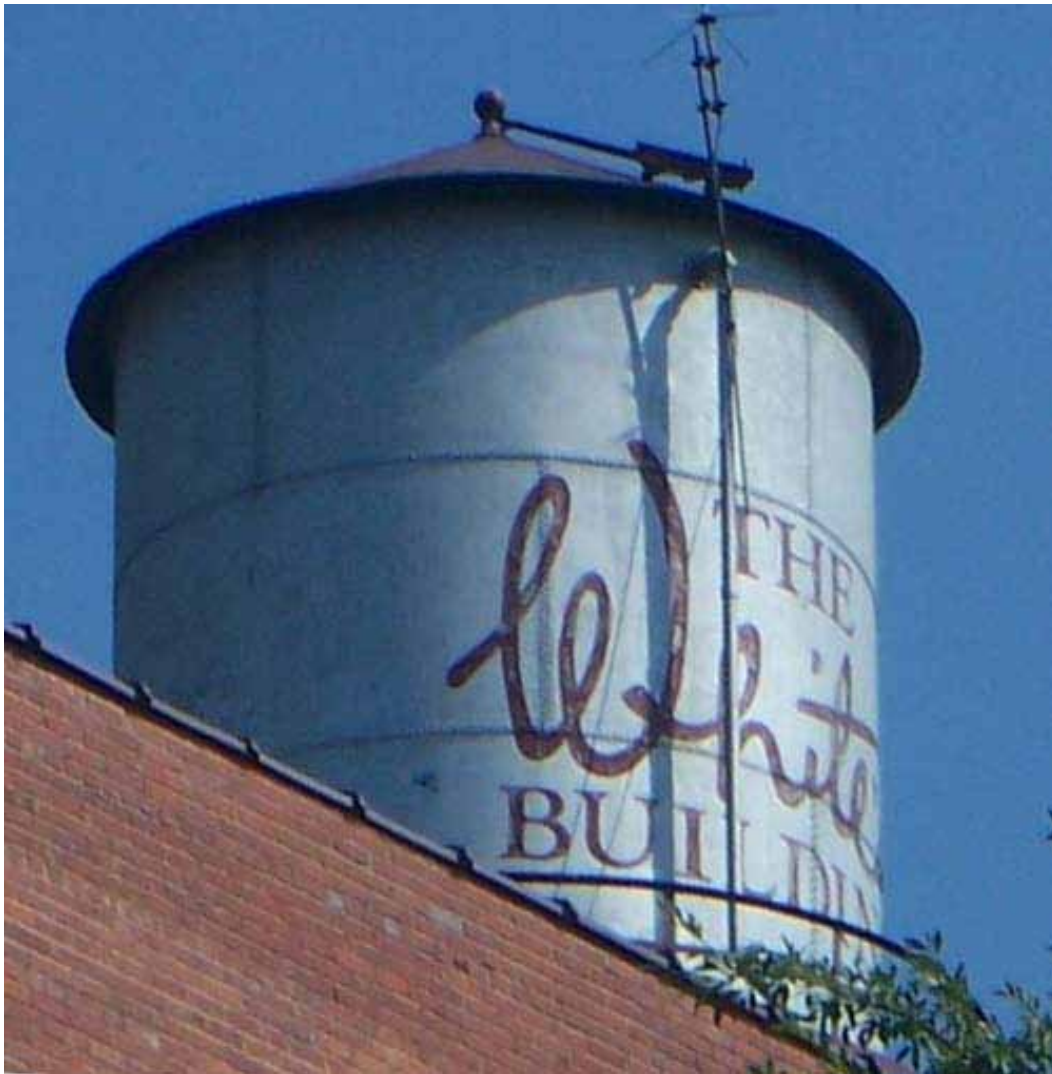


Figure 5. Circular steel tank with bolted joints (CERL).



Figure 6. Double-ellipsoidal water tower at YARS (CERL).



Figure 7. Torospherical water tower in Mount Prospect, IL (Derek Graham on Flickr.com).



Figure 8. Pedestal water tower in Milford, DE (Mike Mahaffie on Flickr.com).



Figure 9. Hydropillar water tower in Tulsa, OK (Topato on Flickr.com).



Figure 10. Madison Barracks, NY water tower (CERL).



Figure 11. Fort Sheridan, IL water tower (CERL).



Figure 12. Collinsville, IL catsup water tower (CERL).

Water towers today

Water towers continue to serve the purpose of water retention and distribution, but tower structures are being developed for multiple uses. Municipalities are incorporating pump stations, fire departments, and town meeting rooms in the bases of their water towers. A reason for this is that water tanks are engineered to standards that far exceed conventional building standards. One tank in a baseball complex in Florida houses bleachers, a press box, and a concession stand. One town in South Carolina considered building office and retail space on seven floors at the base of their water tower.

The water tower at YARS

The water tower at YARS (Figure 13) was built in 1952 by the Pittsburgh-Des Moines Company. The double-ellipsoidal design of the tower is an economical design. The tower reaches a height of about 145 ft and the original checkerboard paint pattern has been replaced through several paint iterations to include the Air Force name and insignia (Figures 14 and 15).

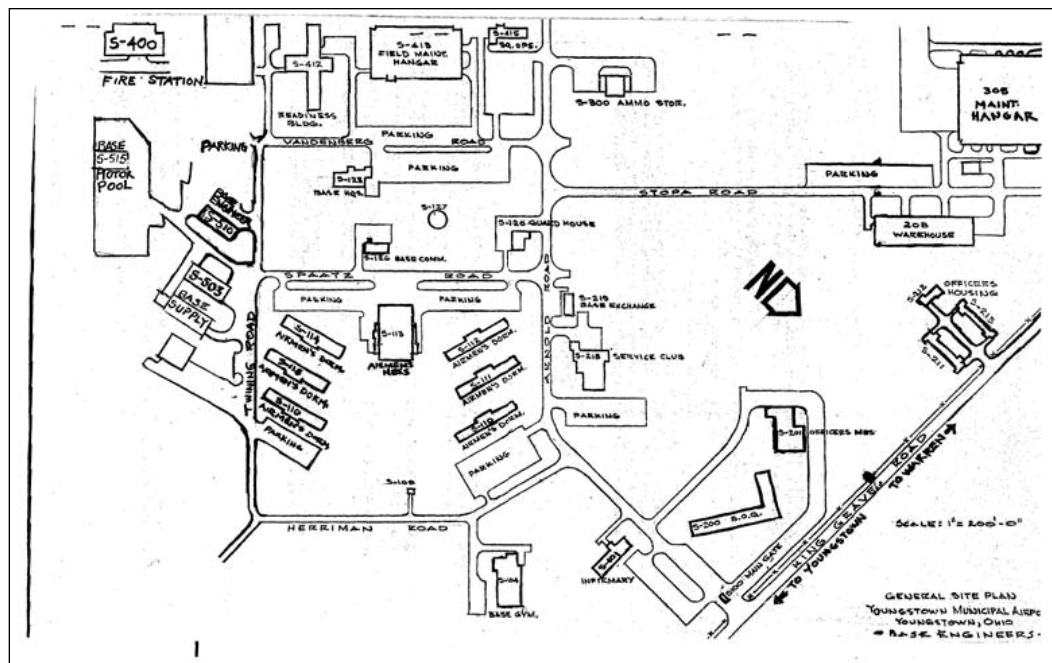


Figure 13. Map of Youngstown Air Force Base from the 1950s, with water tower shown in red (Source: YARS CE).

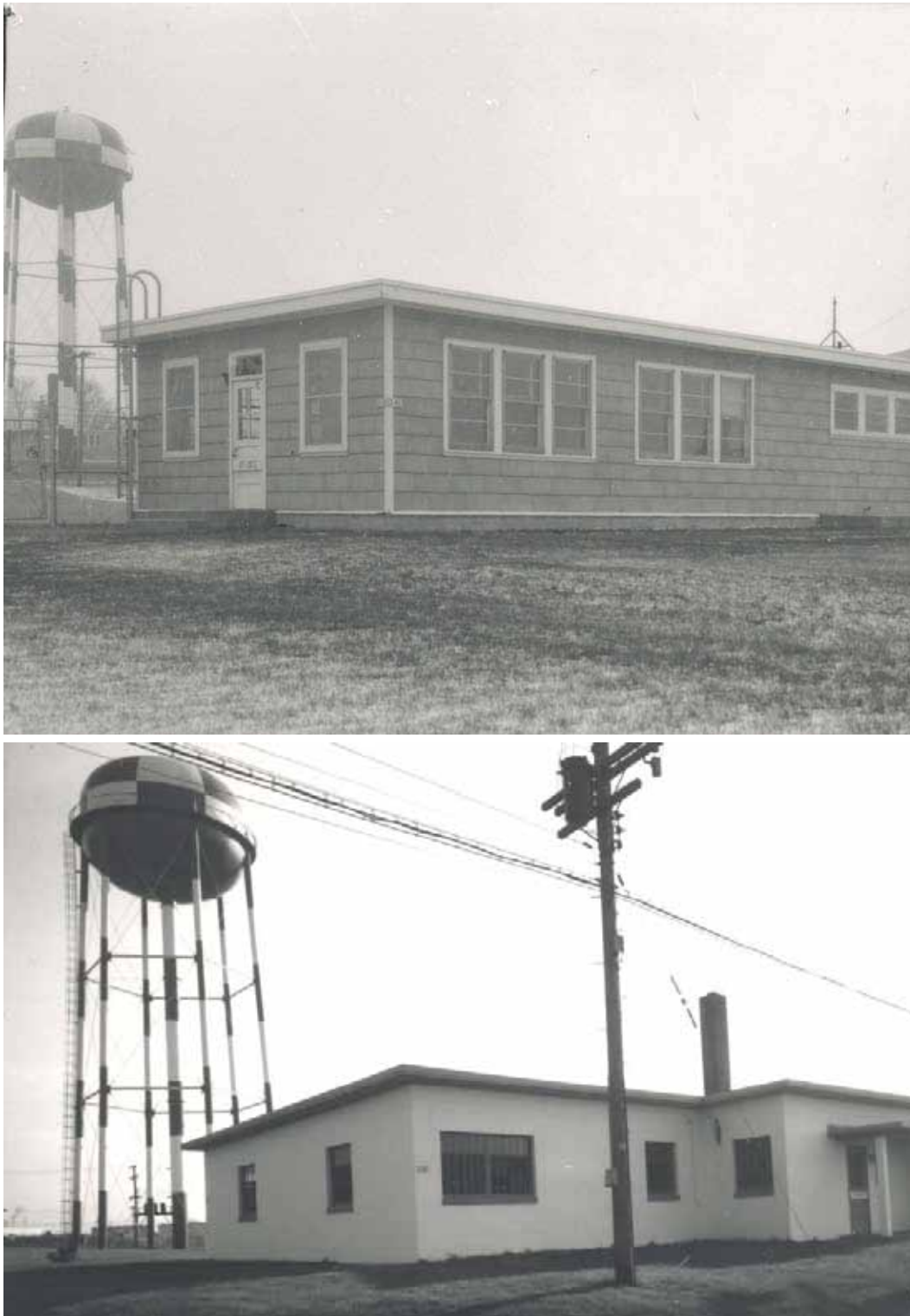


Figure 14. Two historic photographs showing the water tower (Source: YARS CE).



Figure 15. Current view of the water tower (CERL).

3 Survey Results

The identification of historically significant properties is achieved through the evaluation of their position within the larger historic context. According to the NRHP, historic contexts are defined as “...the patterns, themes, or trends in history by which a specific occurrence, property, or site is understood and its meaning (and ultimately its significance) within prehistory or history is made clear.”* A historic property is determined significant or not significant based on the application of standardized National Register Criteria within the property’s historical context.

An April 1996 report by Resource Applications, Inc. provided a historic buildings survey for YARS. The purpose of the report was to identify, inventory, and evaluate the historic resources on site. In 1996, none of the buildings were 50 years of age and, as a result, none were eligible for inclusion on the National Register of Historic Places (Resource Applications, Inc.). In 2009, a report by Historic Preservation Associates determined the water tower as potentially eligible to the NRHP.

Criteria for evaluation

The NRHP Criteria for Evaluation describe how properties and districts are significant for their association with important events or persons (Criterion A and Criterion B), for their importance in design or construction (Criterion C), or for their information potential (Criterion D). The following is a brief description of each of the four NRHP Criteria for Evaluation (excerpted from *National Register Bulletin #15: How to Apply the National Register Criteria for Evaluation*):

A. Event—associated with events that have made a significant contribution to the broad patterns of our history; or

B. Person—associated with the lives of persons significant in our past; or

C. Design/Construction—embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction; or

* National Park Service. 1991, *How to Apply the National Register Criteria for Evaluation*. National Register Bulletin #15. Washington, DC: U.S. Department of the Interior, National Park Service.

D. Information Potential—yielded, or is likely to yield, information important in prehistory or history.

Aspects of integrity

In addition to possessing historical significance, in order to be eligible to the NRHP properties must also retain sufficient physical integrity of features to convey its significance.*

Historic properties either retain integrity and convey their significance, or they do not. Within the concept of integrity, the National Register criteria recognize seven aspects or qualities that, in various combinations, define integrity.

To retain historic integrity a property will always possess several, and usually most, of the aspects. The retention of specific aspects of integrity is paramount for a property to convey its significance. Determining which of these aspects are most important to a particular property requires knowing why, where, and when the property is significant.

Districts and individual resources are considered to be significant if they possess a majority of the following Seven Aspects of Integrity:†

1. *Location.* Location is the place where the historic property was constructed or the place where the historic event occurred.
2. *Design.* Design is the combination of elements that create the form, plan, space, structure, and style of a property. It results from conscious decisions made during the original conception and planning of a property (or its significant alteration) and applies to activities as diverse as community planning, engineering, architecture, and landscape architecture. Design includes such elements as organization of space, proportion, scale, technology, ornamentation, and materials.
3. *Setting.* Setting is the physical environment of a historic property. Setting refers to the character of the place in which the property played its historical role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space.
4. *Materials.* Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.

* National Park Service. 1991, How to Apply the National Register Criteria for Evaluation. National Register Bulletin #15. Washington, DC: U.S. Department of the Interior, National Park Service, pp 44-45.

† *ibid.*

5. *Workmanship.* Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
6. *Feeling.* Feeling is a property's expression of the aesthetic or historic sense of a particular time period.
7. *Association.* Association is the direct link between an important historic event or person and a historic property.

Previous studies

The water tower was not surveyed in the 1996 *Final Report for Historic Buildings Survey, YARS, Vienna, OH* (Resource Applications, Inc. 1996). The water tower was determined as potentially eligible in the *2009 Evaluation of Cold War Era and Potential National Register of Historic Places Eligible Properties: Youngtown Air Reserve Station*. This report stated on page 7-1 that:

Based upon the results of the historical and architectural investigations, review of Cold War context, and building integrity characteristics, it is recommended that no remaining buildings and one structure constructed before 1959 are considered potentially eligible for listing in the National Register of Historic Places under Criterion A, B, or C. Since this was an assessment of buildings and structures, no recommendation has been made for archaeological resources based on Criterion D. Those resources were adequately addressed in the RAI report. One structure, the Double Ellipsoidal water tower (TRU 2808-19) constructed in 1952, is considered to be potentially eligible under Criterion C based upon its type, period, and method of construction. Table 1 provides a listing of all Cold War Era buildings and structures that have survived.

With respect to Criterion A, it has not been established that there were any particular events that would be considered significant with respect to the establishment of the Base, its role within the mission of the USAF, nor its role within the historical context of the USAF within the Cold War period. The base and its mission changed over the years with the requirements of the Department of Defense and the USAF. No significant activities or associations have been identified as having taken place at YARS. The Base has not been associated with any significant Criterion A type events.

Research did not identify any particularly significant persons that had any association with the Base as it developed over the years. Therefore, Criterion B does not apply.

With respect to Criterion C, most of the older buildings have experienced alterations or additions to their original configurations. Their original integrity has been so compromised that they do not merit consideration for potential listing in

the National Register. However, one structure, the Base water tower does appear to be potentially eligible for National Register listing. The water tower is a good representative example of a particular type of water system engineered structure. It was constructed during a period when the double ellipsoidal water tower was a popular form of water storage structure. It is the only example of an elevated water storage structure presently on the Base and represents a good example of its form and engineering.

And from the inventory form:

The water tower is a visual focus point within and adjacent to the base complex. It is the tallest structure found within an environment of restricted height of buildings and structures for aviation purposes. It is the only water tower on base. It provides water for all base systems except for a system located near the flight line designed for massive fire suppression. The Double Ellipsoidal design has been a popular form of water tower construction since the 1930s. Today, its design has a limited use associated with water tower construction. Potentially eligible for National Register listing because of its contribution to civil engineering and design on base.

Found in association with mixed period and use buildings that contribute to the built environment of the base complex. This structure makes a dominant contribution to the physical setting of the base.

Final determinations of eligibility

The following sections detail this study's findings regarding the historical significance of the 1952 water tower at the YARS in Vienna, OH.

For Criterion A – Event

We agree with the finding of the 2009 report that YARS is not associated with any particular event that is significant in the history of the overall Cold War or in the history of the Air Force. The water tower itself is not associated with any particular significant event at YARS.

For Criterion B – Person

There is no significant person associated with the water tower.

For Criterion C – Design/Construction

The Pittsburgh-Des Moines Steel Company and the Chicago Bridge and Iron Company erected between eight and eleven thousand water towers

between the Mississippi River and the Rocky Mountains.*[†] Although the double ellipsoidal water tower is the only water tower at YARS, this fact does not give it historic significance. The water tower was not the first double ellipsoidal water tower constructed either in the country or in the Air Force. It is of a standard engineering design.

For Criterion D – History

The water tower does not add any important historical information.

This report determines the water tower is not eligible to the National Register of Historic Places (NRHP) since it is not individually significant and is not part of a larger historic district.[‡] It is not the first water tower of this type utilized by the Air Force. The water tower at Youngstown is not any different than thousands of double-ellipsoidal water towers in towns and villages across Ohio and the Midwest (Figure 16), and also across the Air Force and Department of Defense.[§]

* Spreng, Ronald E. 1992. "They didn't just grow there – Building water towers in the postwar era." *Minnesota History*. Winter 1992, pp 130-141, <http://collections.mnhs.org/MNHistoryMagazine/articles/53/v53i04p130-141.pdf>

† The exact number of double ellipsoidal water tanks built by the Pittsburgh-Des Moines Steel Company and the Chicago Bridge and Iron Company could not be found. According to a footnote on page 132 of the article by Spreng, he interviewed the chairman emeritus of Pittsburgh-Des Moines Steel Company, William R. Jackson, Sr. via telephone conversation. Jackson reported, "The precise number of water towers erected is difficult to ascertain. Crews worked on other types of storage tanks and vessels, but company records rarely made any distinction among them."

‡ The researchers did examine water towers already listed on the National Register. In every case, these water towers were either individually listed due to their architectural or engineering importance or part of a larger historic district that itself was significant for either Criteria A or C.

§ Researchers at CERL did not find any information that credited any waters of similar design in that region to have any significance to their historical context



Archbold, OH



Beach City, OH



Fayetteville, OH



Malinta, OH



New Concord, OH



North Kingsville, OH



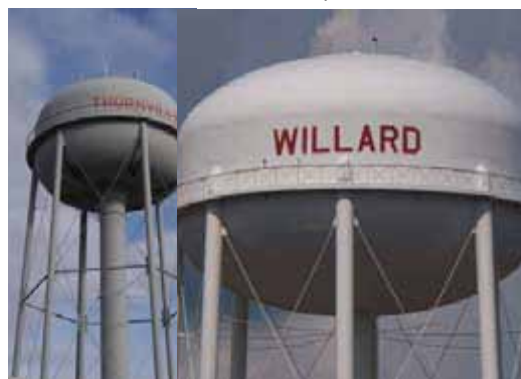
Ottoville, Ohio



Piqua, Ohio



Shawnee, Ohio



Thornville, Ohio

Willard, Ohio

Figure 16. Examples of double-ellipsoidal water towers in Ohio.

4 CERL Inventory Form

YOUNGSTOWN ARS HISTORIC PROPERTY INVENTORY FORM

PROPERTY BOUNDARIES	COMMON/HISTORIC NAME/BUILDING #	STATUS	
Spaatz Road on the northeast Building 126 on the southeast Parking lot off Vandenberg Road on the southwest Building 120 on the northwest	Base Water Tower F-6010	In Use	
ARCHITECT/BUILDER	DATE OF CONSTRUCTION	NO. OF STORIES	FOOTPRINT
Pittsburgh-Des Moines Co.	1952	n/a	Hexagonal
	DATE OF ALTERATIONS		
ROOF FORM	FOUNDATION	WALLS	ROOF
Dome	Concrete		Steel
PROPERTY FUNCTION		NOTABLE FEATURES	
HISTORIC USE(S)	CURRENT USE	o Hexagonal footprint	
Water Tower	Water Tower		

RELATIONSHIP TO OTHER BUILDINGS

Building F-6010 is located northeast of the main airport apron. The building is northwest of Building B126 (Communications) and southeast of Building B120 (Base Exchange).



1. Oblique view of the south elevation (Building 407 – headquarters, on left)



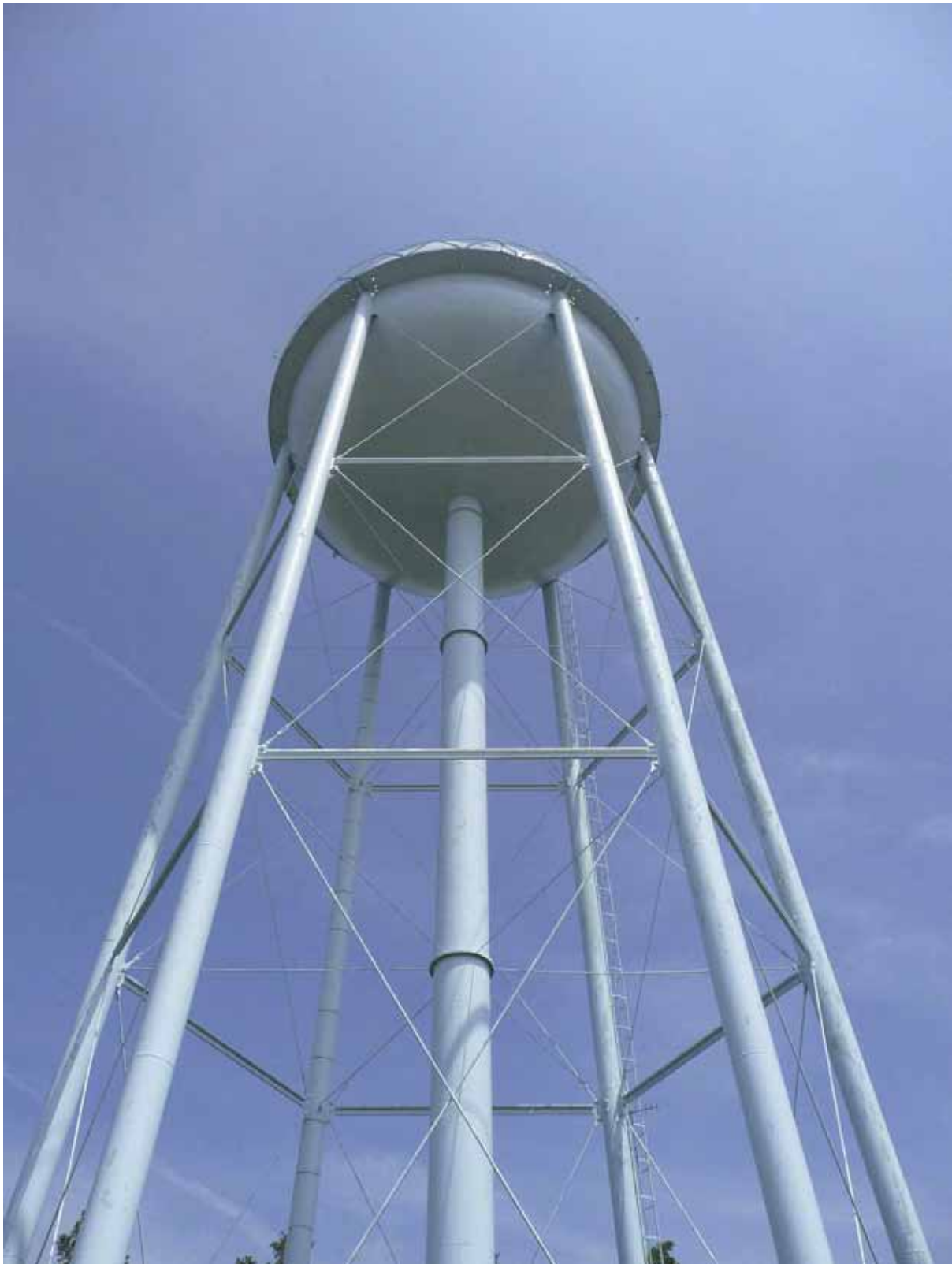
2. Northeast Elevation.



3. Northwest Elevation.



4. Northwest Elevation.



5. View upward at base of water tower.



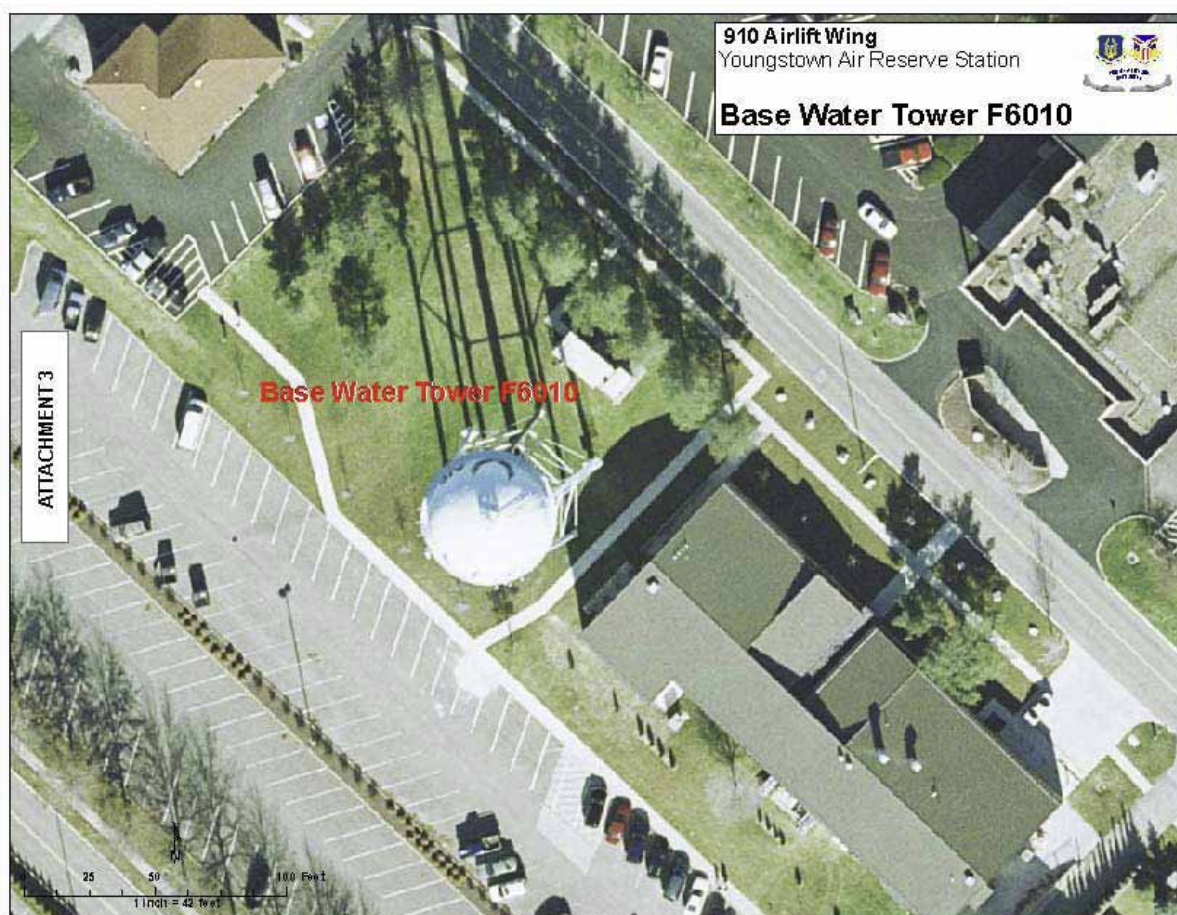
6. Concrete foundation.

COORDINATES

UTM 17
4568800N
526999E

USGS QUAD

Location of base water tower, shown in red.

**Water tower site plan.****PRESENT OWNER**

US Air Force

OWNER ADDRESS

Youngstown Air Reserve Station
3976 King Graves Rd.
Vienna, OH 44473

GENERAL CONDITION OF PROPERTY

EXCELLENT GOOD POOR

ADDITIONS/ALTERATIONS

IF YES, SEE
DESCRIPTION

BIBLIOGRAPHIC SOURCES

Records on file at the CE Office at Youngstown Air Reserve Station, Vienna, OH.

Spreng, Ronald E., "They Didn't Just Grow There — Building Water Towers in the Postwar Era."

Minnesota History (1992): 130–141

PRELIMINARY NATIONAL REGISTER**DETERMINATION OF ELIGIBILITY**

ELIGIBLE/CONTRIBUTING NOT ELIGIBLE

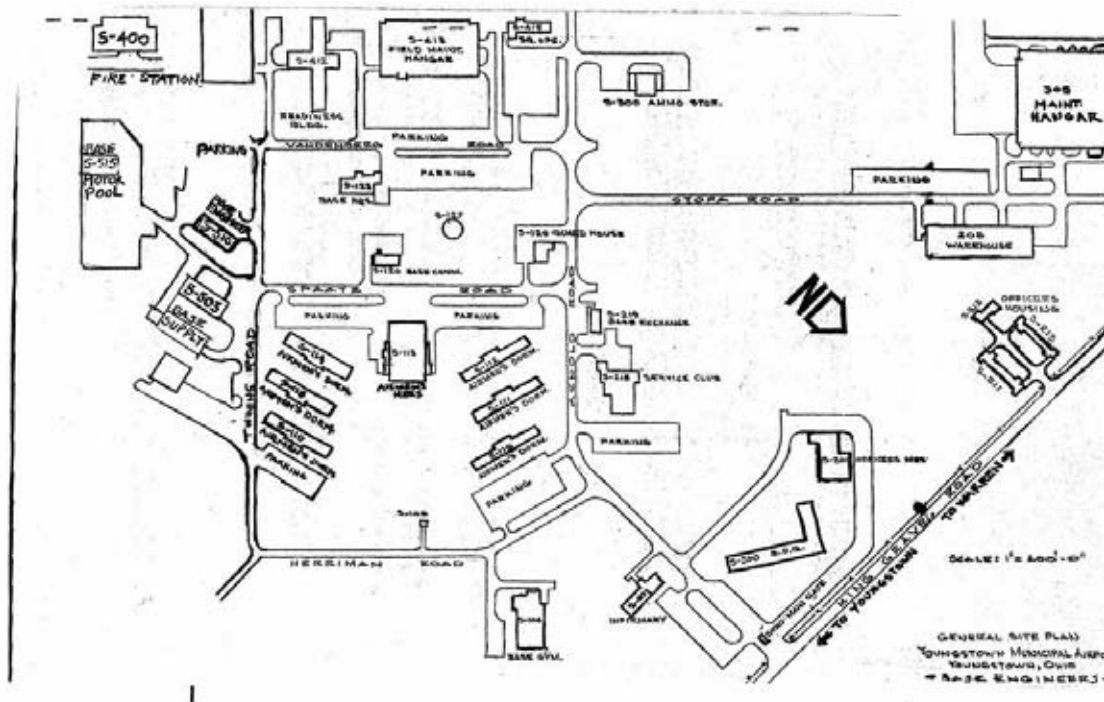
DESCRIPTION**PRELIMINARY NATIONAL REGISTER****DETERMINATION OF ELIGIBILITY**

ELIGIBLE/CONTRIBUTING NOT ELIGIBLE

Building F-6010 is located south of Arnold Road, west of Spaatz Road, north of Twining Road, and east of Vandenberg Road. The water tank is located on this site southeast of Building 120 (Base Exchange) and northwest of Building 126 (Communications). Building F-6010 is an elevated water tank. Six splayed columns support the tank and create a hexagonal footprint. Rods situated vertically in an X-brace type configuration support horizontal struts that keep the six columns in place. A 4 foot diameter riser pipe in the center allows water to enter and exit the elevated tank. The tank at the top of the tower has a domed top and is known as a double-ellipsoidal design. The overall height of the tower is about 145 feet.

HISTORY

The water tower at YARS was built in 1952 by Pittsburgh-Des Moines Company.



Map of Youngstown Air Force Base from the 1950s, with water tower shown in red (Source: YARS CE).



Historic photograph depicting the water tower (Source: YARS CE).



Historic photograph depicting the water tower (Source: YARS CE). The double-ellipsoidal design of the tower is known for being one of the most economical designs. The tower itself reaches a height of about 145 feet. The original checkerboard paint pattern has been replaced through several paint iterations to include the Air Force name and insignia.



View of the water tower (CERL).

INTEGRITY

Building F-6010 is in excellent condition with all of the original design features intact, with the exception of the original paint scheme; however, the altered paint job does not detract from the original design.

DETERMINATION OF CONTRIBUTING/NONCONTRIBUTING STATUS

This report determines the water tower is not eligible to the National Register of Historic Places (NRHP) since it is not individually significant and is not part of a larger historic district. It is not the first water tower of this type utilized by the Air Force. The water tower at Youngstown is not any different than thousands of similar water towers in towns and villages across Ohio and the Midwest, and also across the Air Force and Department of Defense.

References

- Becher Hilla, and Bernd Becher. 1988. "Ammunition and Explosive Storage for the Navy (1939-1989) and the Air Becher." *Water Towers*. Cambridge: The MIT Press.
- Chicago Bridge & Iron Works. 1931. *Elevated Tank Designs Submitted in a Competition*. Chicago: Chicago Bridge & Iron Works.
- Gray, W. S. 1947. *Reinforced Concrete Water Towers, Bunkers, Silos, and Gantries*. London: Concrete Publications Limited.
- Hazlehurst, J. N. 1904. *Towers and Tanks for Water-Works*. New York: John Wiley & Sons.
- Loechl, Suzanne K., Susan I. Enscoe, Megan Weaver Tooker, and Samuel A. Batzli. 2009. *Guidelines for Identifying and Evaluating Historic Military Landscapes*. Technical Report ERDC/CERL TR-09-6. Champaign, IL: Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC-CERL).
- Mitchell, Fred. 2009. *Evaluation of Cold War Era and Potential National Register of Historic Places Eligible Properties: Youngstown Air Reserve Station*. Historic Preservation Associates.
- Resource Applications, Inc. 1996. *Final Report for Historic Buildings Survey, Youngstown Air Reserve Station, Vienna, OH*. Falls Church, VA: Resource Applications, Inc.
- Spreng, Ronald E. 1992. "They didn't just grow there — Building water towers in the postwar era." *Minnesota History*, pp 130-141.
- Architectural Forum*. May 1949. "Water Towers of Welded Steel." May 1949, pp 129-130.

Archival Sources

Records on file at the CE Office at the Youngstown Air Reserve Station in Vienna, OH.

Appendix A: Historic Preservation Associates Form

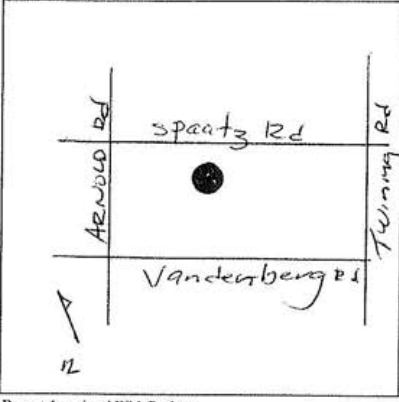
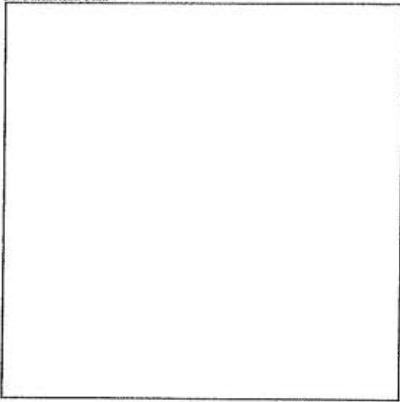
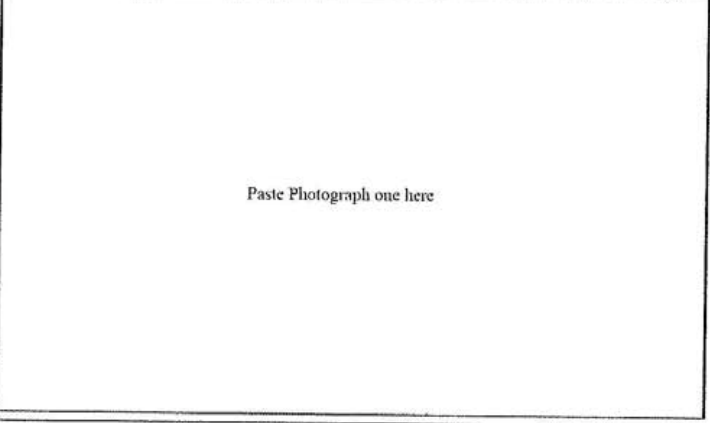


Ohio Historic Preservation Office
1982 Velma Avenue
Columbus, Ohio 43211-2497
(614)298-2000

OHIO HISTORIC INVENTORY

RPR Number:

1. No TRU 2808 - 19		4. Present Name(s) F6010 Base Water Tower		1. No TRU 2808
2. County Trumbull		5. Historic or Other Name(s) Water Tower		
6. Specific Address or Location 3976 Kings Graves Road		19a. Design Source Civil Engineering of Water Towers	35. Plan Shape	2. County Base Water Tower Youngstown Air Reserve Station (YARS)
6a. Lot, Section or VMD Number		20. Contractor or Builder	36. Changes associated with 17 17b Dates 17	
7. City or Village Vienna, Ohio 44473		21. Building Type or Plan	17b	3. Present or Historic Name(s) Base Water Tower Youngstown Air Reserve Station (YARS)
9. U.T.M. Reference Quadrangle Name 17 550013 4556562 Zone Easting Northing		22. Original Use, if apparent DEFENSE/FORTIFIED/MILITARY	37. Window Type(s)	
10. Classification Structure		23. Present Use DEFENSE/FORTIFIED/MILITARY	38. Building Dimensions	4. Present or Historic Name(s) Base Water Tower Youngstown Air Reserve Station (YARS)
11. On National Register? No		24. Ownership Public	39. Endangered? By What?	
13. Part of Established Hist. Dist? No		25. Owner's Name & Address, if known United States Air Force 3976 Kings Graves Rd., Vienna, Ohio	40. Chimney Placement	5. Present or Historic Name(s) Base Water Tower Youngstown Air Reserve Station (YARS)
15. Other Designation (NR or Local) None		26. Property Acreage	41. Distance from & Frontage on Road	
16. Thematic Associations: MILITARY/DEFENSE		27. Other Surveys None	51. Condition of Property	6. Specific Address or Location 3976 Kings Graves Road
17. Date(s) or Period 1952		28. No. of Stories 11 - 24 stories	52. Historic Outbuildings & Dependencies Structure Type	
18. Style Class and Design Dominant Other		29. Basement?	Date	6. Specific Address or Location 3976 Kings Graves Road
18a. Style of Addition or Elements(s)		30. Foundation Material	Associated Activity	
19. Architect or Engineer Corps of Engineers		31. Wall Construction	53. Affiliated Inventory Numbers Historic (OHI)	6. Specific Address or Location 3976 Kings Graves Road
		32. Roof Type Roof Material	Archaeological (OAI)	
42. Further Description of Important Interior and Exterior Features (Continued on Reverse if Necessary)				
<p>Constructed in 1952 and designed by the Pittsburgh-Des Moines Steel Company, this is Double Ellipsoidal style elevated water tank. This example stands approximately 138' high with the tank being 52' in diameter. The tank itself is approximately 35' high. It is supported on a cradle composed of six steel columns configured within a hexagon. Narrow cross struts help to minimize movement of the columns and add stability. One ladder and ladder guard rise to terminate at a catwalk that crosses the tank at approximately mid level. Capacity within the water tank is 300,000 gallons.</p>				
43. History and Significance (Continue on Reverse if necessary)				
<p>The water tower is a visual focal point within and adjacent to the base complex. It is the tallest structure found within an environment of restricted height of buildings and structures for aviation purposes. It is the only water tower on the base. It provides water for all base systems except for a system located near the flight line designed for massive fire suppression. The Double Ellipsoidal design had been a popular form of water tower construction since the 1930s. Today, its design has a limited use associated with new water tower construction. Potentially eligible for National Register listing because of its contribution to civil engineering and design on the base.</p>				
44. Description of Environment and Outbuildings (See #52)				
<p>Found in association with mixed period and use buildings that contribute to the built environment of the base complex. This structure makes a dominant contribution to the physical setting of the base.</p>				
45. Sources of Information				
<p>Personal Observation, YARS Engineering Office.</p>				
46. Prepared By: Fred Mitchell		47. Organization: Historic Preservation Associates		48. Date Recorded: 06/09/2009
49. PIR Reviewer:				50. PIR Review Date:

1. No	TRU 2808	4. Present Name(s)	F6010 Base Water Tower	1 No
2. County	Trumbull	5. Historic or Other Name(s)	Water Tower	
8. Site Plan with North Arrow		54. Farmstead Plan		
				<p>Door Selection: Unknown</p> <p>Door Position:</p> <p>Orientation:</p> <p>Symmetry:</p>
Report Associated With Project: NADB #:				
		Photograph 1		
		Photograph 2		

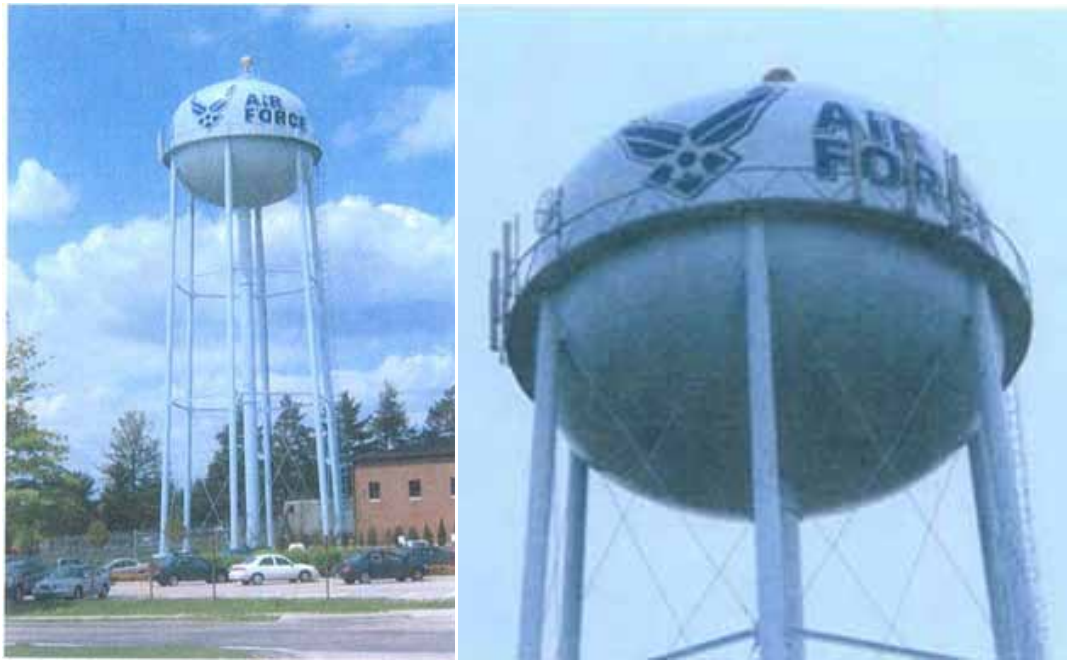


Figure A1. Bldg F5010 TRU 2808-19, Youngstown ARS (photo dated 12May09).

REPORT DOCUMENTATION PAGE				<i>Form Approved</i> OMB No. 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</small>					
1. REPORT DATE (DD-MM-YYYY) 15-11-2010		2. REPORT TYPE Final		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Architectural Survey of a Water Tower in Youngstown Air Reserve Station				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT	
6. AUTHOR(S) Chris J. Cochran and Adam Smith				5d. PROJECT NUMBER MIPR	
				5e. TASK NUMBER F5Q3370173G001	
				5f. WORK UNIT NUMBER 333529	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Engineer Research and Development Center (ERDC) Construction Engineering Research Laboratory (CERL) PO Box 9005, Champaign, IL 61826-9005				8. PERFORMING ORGANIZATION REPORT NUMBER ERDC/CERL TR-10-28	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Youngstown Air Reserve Station 3976 King Graves Road Vienna , OH 44473				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT This document is an assessment of the base water tower at the Youngtown Air Reserve Station. Since its construction in 1952, the water tower has remained generally unchanged. The demolition and reconstruction of surrounding buildings makes Youngstown Air Reserve Station ineligible for the NRHP as a historic district. This survey satisfies Section 110 of the National Historic Preservation Act of 1966 as amended, and was used to determine the eligibility of the water tower for inclusion on the NRHP. It is the determination of this report that the water tower is not eligible to the National Register of Historic Places (NRHP) since it is not individually significant and is not part of a great historic district.					
15. SUBJECT TERMS Youngstown Air Reserve Station, National Register of Historic Places (NRHP), cultural resources management, water tower, historic buildings					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code)
			SAR	52	